

Empirical data presented below represent the scientific results obtained during September 2014 - December 2015 implementation project phase.

## **I. Maternal contributors to child self-regulation**

### ***a. Observational data***

Although **maternal autonomy** support is important in predicting early child self-regulation (SR) (Matte-Gange et al. 2014) this parental practice has received little empirical attention during toddlerhood (Yap & Jorm, 2015). Maternal autonomy support refers to parenting behaviors aimed at supporting children's goals, choices and ensuring that the child plays an active role in successful completion of a task. Also, mother's and children's positive emotions have been even less studied in relation to child SR. Therefore, our aims were as follow:

- 1) To examine in a sample of 40 (21 girls) mother-toddler (two-year-old) dyads the role of maternal autonomy support in predicting child SR.
- 2) To examine the relation between toddlers', mothers and dyads' positive emotion expression and child SR.
- 3) To analyze the relation between other child temperamental characteristics (Surgency and Negative Affectivity) and child SR.

### **Measures**

- Child SR - Effortful control dimension was assessed with *Early Childhood Behavior Questionnaire-Very Short Form* (ECBQ, Putnam & Rothbart, 2006); Lability/Negativity subscale and Emotion Regulation subscale from *Emotion Regulation Checklist* (ERC, Shields & Cicchetti, 1997)
- Frequency of mother smiling, child smiling and dyads' smiling - was coded during an observational coloring task (Friedlmeier & Corapci 2013, unpublished manuscript, GVSU, Allendale, MI)
- Maternal autonomy support was coded also during the coloring task based on Grolnick (2002) coding system.
- Child Surgency and Negative Affectivity - *Early Childhood Behavior Questionnaire-Very Short Form* (ECBQ, Putnam & Rothbart, 2006).

## Results

Maternal autonomy significantly predicts child effortful control (see Table 2). This result suggests that children of mothers who displayed higher levels of autonomy are perceived by their mothers to have higher capacity to inhibit a dominant impulse or response, detect errors and enact a subdominant response or behavior. Maternal autonomy support mediates the relation between child's positive emotions and child's effortful control. This effect might indicate as recently suggested (Bridgett et al. 2015) that parenting behavior is a key social mechanism for the transmission of SR.

Correlation analysis (see Table 1) shows that frequency of dyads' smiling during the coloring task is positively related to toddler's emotion regulation abilities as perceived by their mothers.

Both child's negative affectivity and surgency are significantly associated with child's effortful control. This result is important given that previous studies have reported inconsistency in findings regarding the effect of these temperamental traits on effortful control in young children (Eisenberg et al., 2013; Blankson et al., 2011).

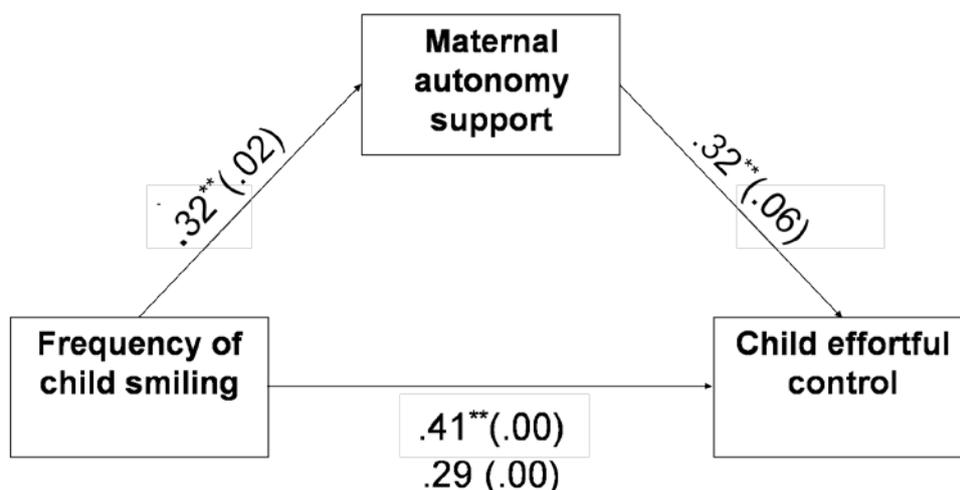


Fig 1. Indirect association of child positive affect with child effortful control via maternal autonomy support

Table 1. *Pearson Correlations between Studied Variables*

	1	2	3	4	5	6	7	8	9	10
1. Gender of Child	–									
2. Maternal autonomy support	-.28	–								
3. Frequency of mother	-.07	.21	–							
4. Frequency of child smiling	.06	.33 <sup>†</sup>	.38 <sup>†</sup>	–						
5. Frequency of dyads`	.09	.37 <sup>†</sup>	.70 <sup>**</sup>	.83 <sup>**</sup>	–					
6. Negative Affectivity	.06	-.35 <sup>†</sup>	-.17	-.20	-.16	–				
7. Surgency	.15	.13	.03	.34 <sup>†</sup>	.23	-.27	–			
8. Effortful Control	-.21	.42 <sup>**</sup>	.23	.41 <sup>**</sup>	.39 <sup>†</sup>	-.50	.46 <sup>**</sup>	–		
9. ERC Emotion Regulation	-.13	.14	.27	.30 <sup>†</sup>	.35 <sup>†</sup>	-.22	.52 <sup>**</sup>	.46 <sup>**</sup>	–	
10. ERC Lability	.33 <sup>†</sup>	-.16	-.07	-.02	-.05	.45 <sup>**</sup>	-.16	-.61 <sup>**</sup>	-.25	–

Note. <sup>†</sup>p ≤.05, <sup>\*\*</sup>p ≤.01

Table 2. *Hierarchical Regression Analysis for Variables Predicting Children's Effortful Control*

Predictor	ΔR <sup>2</sup>	β	SE B
Step 1	.18 <sup>**</sup>		
Maternal autonomy support		.17 <sup>**</sup>	.06
Step 2	.08 <sup>†</sup>		
Maternal autonomy support		.13 <sup>†</sup>	.28
Frequency of child smiling		.01 <sup>†</sup>	.06
Step 3	.00		
Maternal autonomy support		.13 <sup>†</sup>	.06
Frequency of child smiling		.01	.01
Frequency of dyads` smiling		.00	.02
Step 4	.22 <sup>**</sup>		
Maternal autonomy support		.08	.06
Frequency of child smiling		.00	.01
Frequency of dyads` smiling		.01	.01
Surgency		.27 <sup>†</sup>	.13
Negative Affectivity		-.32 <sup>**</sup>	.13
Total R <sup>2</sup>	.48		

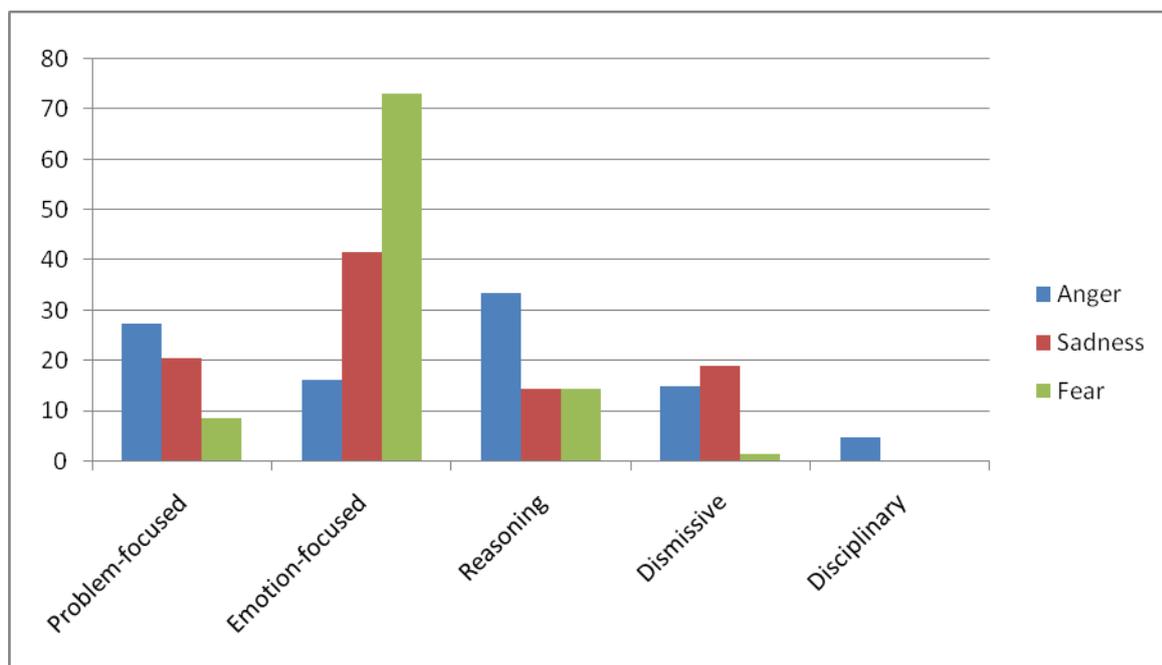
Note. <sup>†</sup>p ≤.05, <sup>\*\*</sup>p ≤.01

These data were included in the poster presentation *Parenting and self-regulation in toddlers*, authors Oana Benga, Georgiana Susa & Ionut Sergiu Mone, 17th European Conference on Developmental Psychology, Braga, Portugalia (sept. 2015).

### ***b. Interview data***

Emotional self-regulation is defined as “not only the modulation of the experience of emotion and related physiological states but also the regulation of overt behaviors that are associated with the experience of emotion (e.g., facial expressions of emotion, reactive aggression)” (Eisenberg & Spinrad, 2004). Its development is influenced by a constellation of factors, both intrinsic, such as neurobiological maturation and temperament and extrinsic, such as family, peer, and cultural influences (Brownell & Kopp, 2007).

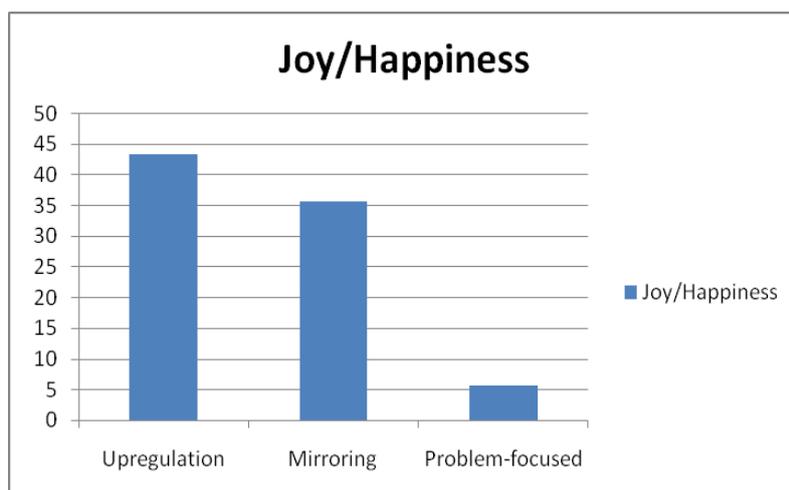
Maternal responses to toddlers in situations that elicit negative emotions (e.g., anger, sadness, fear) and positive emotions (e.g., happiness), via open-ended interviews, were explored in a sample of 40 mothers ( $M = 31.49$  years,  $SD = 3.27$ ; children's age  $M = 24.63$  months,  $SD = 3.33$ ). Maternal responses to vignettes specifying the emotion-eliciting situation and toddler's emotion were presented to all participants, and their responses were recorded and further coded according to different response categories. For negative emotions, the most prevalent categories were: problem-focused, emotion-focused, reasoning, dismissive and disciplinary responses.



**Figure 2. Maternal strategies for negative emotions.**

Pairwise comparisons for response categories with adjustments for multiple comparisons made with Bonferroni corrections revealed that in the case of *anger*, mothers endorsed both reasoning and problem-focused responses significantly more than other responses ( $p$ 's ranged from .04 to .001), followed by emotion-focused and dismissive responses. On the other hand, disciplinary responses were least often endorsed ( $p$ 's ranged from .013 to .001).

In the case of *sadness*, pairwise comparisons of response categories evidenced that emotion-focused responses were endorsed significantly more than all other responses ( $p < .001$ ), that were endorsed at similar rates. On the other hand, in the case of *fear*, mothers reported both problem-focused and reasoning as significantly more than dismissive responses ( $p = .03$  and  $p < .001$ , respectively).



**Figure 3. Maternal strategies for positive emotions.**

In the case of *joy/happiness*, upregulation (meaning escalating toddlers' happiness expression by verbal and nonverbal means), as well as mirroring (validating emotion) were endorsed at similar rates ( $p = .08$ ), and both were endorsed significantly more than problem-focused responses ( $p < .001$ ).

Detailed analysis and discussion of these results, within a comparative cross-cultural comparison framework, are subject of a collaborative manuscript (in review) with dr. Feyza Corapci and dr. Wolfgang Friedlmeier.

## **II. Maternal and child contributors to child psychopathology**

### ***a. Toddler data***

The primary goal of this study was to evaluate, in a sample of younger children (*mean age* = 26.71 *SD*=6.08), the relation between maternal perception of child temperament and maternal involvement in terms of time spent in various activities with children. In addition, we also explored the outcomes of mother involvement on children internalizing and externalizing symptoms. Child temperament was measured with *The Early Childhood Behavior Questionnaire* (ECBQ; Putnam, et al., 2002); the amount of time mothers and fathers spent in various activities with their children was assessed with an adapted version of *Daily Activities Questionnaire* (Bridgett, Gartstein, & Putman, 2011) and internalizing/externalizing symptoms were evaluated with *ASEBA CBCL/11/2-5* (Achenbach & Rescorla, 2000).

Mother involvement was significantly and positively associated with perception of child temperamental surgency. Moreover, mothers were significantly more involved with their daughters compared to their sons [ $t(43) = 1.97, p = .05$ ]. Our findings also provide support for the effects of mother involvement on children internalizing and externalizing symptoms: maternal involvement marginally predicted child externalizing symptoms ( $\beta = .18$ ) after accounting for other child temperamental traits (e.g. negative affectivity, surgency and effortful control).

These data are further explored within a manuscript in preparation.

### ***b. Preschool data***

Given the relative paucity of data examining the joint influence of child and parental variables to the development of child psychopathology, the aim of the present study was to investigate concurrently the contributions of child and parental variables to the development of anxiety symptoms in preschool-aged children.

Our specific objectives were:

(1) to assess child threat-related attentional biases and their impact on child anxiety symptoms during preschool period;

(2) to analyze the relation between parental temperamental variables and child anxiety symptoms within a unitary conceptual framework and using analogue instruments for the assessment of child temperament and parental temperament, respectively;

(3) to examine to what extent all subcomponents of child temperamental effortful control, namely inhibitory control, attentional shifting and attentional focusing, represent unique correlates of childhood anxiety.

Participants were a total of 104 children in the age-range 43 to 79 months ( $M = 59.65$ ,  $SD = 8.90$ ) participated in this study.

#### Questionnaire measures

**Child anxiety.** Child anxiety symptoms were assessed with the Spence Preschool Anxiety Scale (Spence, Rapee, McDonald, & Ingram, 2001).

**Child temperament.** In order to evaluate child temperament, parents were asked to complete the Children's Behavior Questionnaire. In this study we used a translated version and validated version of CBQ on Romanian population (CBQ; Rothbart, Ahadi, Hershey, & Fisher, 2001; see Benga, 2004 for the Romanian translation).

**Maternal anxiety.** We assessed maternal anxiety with the Trait Scale of the State Trait Anxiety Inventory (STAI-T; Spielberger, 1973). For our sample we used a validated version of the STAI on Romanian population (see Pitariu & Pleasa, 2007).

**Maternal temperament.** Maternal temperament was measured using the Adult Temperament Questionnaire (Evans & Rothbart, 2007).

**Attentional biases task.** As a measuring tool for child attentional biases we used the pictorial Dot-probe task adapted from Bradley, Mogg, Falla, & Hamilton (1998). The images used during the experimental trials were selected from NimStim (Tottenham et al., 2009; <http://www.macbrain.org/resources.htm>); Ekman stimuli set (Ekman & Friesen, 1976); and from the stimuli developed by Mogg and Bradley (Bradley et al., 1998).

#### Results

Two kinds of attentional biases in relation to threatening stimuli (angry faces) emerged in this age group, namely vigilant ( $n = 56$ ), and avoidant ( $n = 48$ ) children.

*Child threat related attentional bias scores and child anxiety*

Correlation analyses revealed that threat-related attentional bias was positively related to anxiety symptoms,  $r(48) = .28, p = .05$  only in the case of the avoidant group. This significant correlation showed that children who presented a bias away from angry faces were perceived by their mothers as having higher levels of anxiety. Threat bias scores did not correlate with the anxiety level in the case of the vigilant group. We also analyzed the relation between anxiety subscale scores from the Spence Preschool Anxiety Scale and threat attentional bias scores for both vigilant and avoidant children. This analysis showed that attentional threat bias scores were marginally positively correlated with social anxiety and separation anxiety symptoms for avoidant children ( $r(48) = .26, p = .07$  for social anxiety;  $r(48) = .27, p = .08$  for separation anxiety) while for vigilant children a reversed pattern was observed, namely for these children threat related attentional bias scores were marginally negatively correlated with social anxiety symptoms,  $r(56) = -.23, p = .09$ .

Table 3. Descriptive statistics for anxiety subscales scores and Pearson correlation between anxiety subscales and bias angry scores

	<i>Descriptives</i>						<i>Pearson Correlation</i>	
	<i>N</i>		<i>M</i>		<i>SD</i>		<i>Bias Angry Score</i>	
	<i>Vigilant</i>	<i>Avoidant</i>	<i>Vigilant</i>	<i>Avoidant</i>	<i>Vigilant</i>	<i>Avoidant</i>	<i>Vigilant</i>	<i>Avoidant</i>
<i>Social Anxiety</i>	56	48	4.68	5.02	4.04	3.42	-.23	.26
<i>GAD</i>	56	48	3.50	4.19	3.62	4.01	-.08	.22
<i>OCD</i>	56	48	3.54	3.69	3.12	3.12	-.16	.21
<i>Physical Injury Fears</i>	56	48	7.21	7.75	5.67	4.80	-.06	.16
<i>Separation Anxiety</i>	56	48	4.57	6.17	3.75	3.92	-.03	.27

*Child temperament and anxiety*

In the case of both vigilant and avoidant groups child temperamental fear was significantly related to anxiety symptoms (vigilant:  $r(56) = .65, p = .000$ ; avoidant:  $r(48) = .50, p = .000$ ).

Moreover, sadness as part of temperamental negative affectivity was also significantly related to anxiety symptoms (vigilant:  $r(56) = .47, p = .000$ ; avoidant:  $r(48) = .43, p = .002$ ). Regarding the subdimensions of effortful control, only for the vigilant group, attentional shifting was significantly associated with the anxiety level,  $r(56) = -.30, p = .02$ .

#### *Maternal temperament, maternal trait anxiety and child anxiety symptoms*

For the vigilant group, maternal temperamental fear and sadness positively correlated with child anxiety symptoms,  $r(56) = .44, p = .001$  for maternal fear and  $r(56) = .43, p = .001$  for maternal sadness. Also for this group of children, maternal attentional control was significantly related to child anxiety symptoms,  $r(56) = -.48, p = .000$ . For the avoidant group, the only maternal temperamental trait that was significantly associated with child anxiety was attentional control,  $r(48) = -.40, p = .004$ . However, maternal anxiety was significantly correlated with child anxiety symptoms in both groups (vigilant:  $r(56) = .54, p = .000$ ; avoidant:  $r(48) = .37, p = .009$ ).

**Referinta** Oana Benga, Georgiana Susa-Erdogan & Paul Murza (manuscript under review in *Cognition & Emotion*). *Child and maternal predictors of early childhood anxiety: Different profiles for children with biases towards versus away from threat*

#### *c. School-aged children*

We conducted a collateral study with a sample of 100 older children aged 8 to 12 ( $M = 122.26$  months,  $SD = 9.240$ ). We selected this sample because we were interested to explore the impact of emotional distractors on executive control of attention and in order to fulfil this goal we had to develop a complex paradigm that was not suitable for younger children. Specifically, we investigated the relation between individual differences in effortful control, particularly inhibitory control and attentional control subcomponents, subclinical anxiety and executive control of attention in the context of positive and negative emotional distractors. To assess executive control of attention we presented angry, happy and neutral facial expressions distractors during a primary letter discrimination task, based on the protocol described by Gehring & Knight (2002). We included angry as well as happy facial expressions, given that several previous studies conducted with children showed that anxiety can also influence performance in the presence of positive stimuli (e.g., Reinholdt-Dunne et al., 2012; Waters et

al., 2008; 2010; Kadosh et al., 2014). The primary letter discrimination task elicits both the inhibition and shifting components (functions) of executive control of attention.

## Measures

### Questionnaires

Participants were assessed with Inhibitory Control subscale from the Early Adolescent Temperament Questionnaire-Revised (EATQ-R; Ellis & Rothbart, 2001) and the child version of the Attentional Control Scale (ACS-C; Derryberry & Reed, 2002). Anxiety symptoms were evaluated with child-report of the Spence Child Anxiety Scale (SCAS; Spence, 1998).

### The emotional letter discrimination task

In order to assess the executive control of attention in the presence of emotional distractors children performed a letter discrimination reaction time task, that required attention switching and the ability to filter out irrelevant information. We programmed our emotional version of this task using E-Prime version 1.2. During the letter discrimination task, we concurrently presented neutral, happy and angry emotional faces stimuli selected from the NimStim database (Tottenham et al., 2009; <http://www.macbrain.org/resources.htm>) that children were instructed to ignore.

## Results

Higher levels of anxiety were associated with larger flanker conflict in the presence of happy distractors ( $B = 1.08$ ,  $p = .07$ ,  $\eta_p^2 = .02$ ). Also, when considering as a dependent variable the mixing cost (costs associated with the need to coordinate and maintain two attentional sets), ANCOVA analysis revealed only a significant interaction effect between face valence and anxiety,  $F(2, 95) = 3.75$ ,  $p < .05$ ,  $\eta_p^2 = .07$ . By looking at parameter estimates in order to interpret this interaction we found that there was a tendency for higher levels of anxiety to be associated with higher Mixing cost when happy faces distractors were presented ( $B = 1.44$ ,  $p = .07$ ,  $\eta_p^2 = .02$ ). Moreover, we also found a significant interaction between inhibitory control and face valence,  $F(2, 94) = 3.65$ ,  $p < .05$ ,  $\eta_p^2 = .07$ . This interaction showed that

higher levels of inhibitory control were associated with smaller Flanker conflict when angry faces distracters were presented ( $B = - 36.17, p < .05, \eta_p^2 = .04$ ).

**Referinta** Georgiana Susa-Erdogan, Oana Benga, Ionut Mone, & Mircea Miclea: *The impact of childhood anxiety on processes of attentional executive control in the presence of emotional face distractors* (manuscript under review in *Journal of Experimental Psychopathology*)

